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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,806	12/24/2003	Toshiaki Yoshihara	032148	1723

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EXAMINER	
DINH, DUC Q	

ART UNIT	PAPER NUMBER
2629	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/743,806	YOSHIHARA ET AL.	
	Examiner	Art Unit	
	DUC Q. DINH	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 23, 2007 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3-5, 7, 10, 11-12 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshinaga et al. (U.S Patent No. 6,961,038), hereinafter Yoshinaga.

In reference to claim 1, Yoshinaga discloses field-sequential type display device (Fig. 1) for performing a display by synchronizing successive switching of lights of a plurality of colors (R, G, B light sources in Fig. 2; col. 7, lines 21-26) to be incident on a display element with light control in said display element based on display data of each color corresponding to an image to be displayed, (pixel of the display is the display element with light control in the display element based on the display data of each R, G, B color; col. 5, lines 12-19) comprising:

a detecting unit (14, 15 and 16) for detecting a grayscale level of the display data for each color (R, G, B color signals output from A/D conversion circuit 11-13 are inputted to the luminance detection circuit, 14, 15 and 16 to detect the minimum and maximum luminance/brightness of the R, G and B data; col. 8, line 65-col. 9, line 5); and

an adjusting unit (21, 22 and 23) for adjusting, individually for each color, an intensity of light incident on said display element and a light control variable in said display element, based on a detection result of said detecting unit (the detection unit 14, 15 and 16 after detect the luminance/brightness level of the display data R, G, B provide the detection result to the light control unit in light source unit 23 for adjusting an intensity of R,G,B lights incident on the pixel element; see col. 5, lines 23-30; and Figs. 2-8 show the light intensity of the R, G, B light source are adjusted according to the detected brightness/luminance level display data; furthermore, the result of the luminance/brightness detection result also provide to the display panel 22 to adjust the light control variable in the display element [the variable luminance/brightness of the pixel of the display according to the provided display data]. The P/S conversion circuit 20 are supplied via the frame memory 21 to the liquid crystal display part 22 to control the light variable (luminance/brightness) of the display pixel in display part 22; see col. 8, lines 57-67).

Furthermore, Yoshinaga discloses the detection of a grayscale level by said detecting unit (20) and the adjustments of the intensity of light (R, G, B light sources) and the light control variable (pixel element on display panel) by said adjusting unit (21, 22 and 23) are performed for each color of light incident on said display element (the brightness signal of R, G, B colors are compared for one pixel to detect a minimum value [see col. 7, lines 40-46] the R, G, B input signal are also supplied to the image/brightness detection unit 15 to detect a change of the

maximum brightness level of the white level of the W field; col. 5, lines 39-55; col. 7, lines 60-65; and see col. 8, lines 57-64)

In reference to claim 3, Yoshinaga discloses the detecting unit detects a grayscale level (brightness/luminance) of maximum brightness of the display data in a predetermined period, (the value of Wmin obtained from the detecting brightness level, i.e. grayscale level of the display data, is compared over an entire predetermined frame period to determine the maximum value Wmax of the brightness level; see col. 7, lines 45-50) and, when obtaining the maximum brightness, said adjusting unit (21,22 and 23) adjusts the light control variable in said display element so as to have maximum transmittance of incident light on said display element and adjusts the intensity of incident light according to the adjusted light control variable (the value of the Wmax*X is stored in memory 21... the emission intensity of each of the R, G, B light sources is determined so that this values can be obtained; see col.7, line 65 – col. 8, line 8).

In reference to claim 4, Yoshinaga discloses when obtaining brightness of a grayscale level other than the grayscale level of maximum brightness, said adjusting unit adjusts the light control variable in said display element (Fig. 4 shows when the white field is set to zero luminance, i.e. the obtaining of luminance level other than the maximum brightness, display information given to the liquid crystal part in R, G, B fields is display with 100% gradation level without being subjected to subtraction process, i.e. the original display data provide to the display panel to adjust the pixel gradation level according to the original input display data; col. 10, lines 28-32).

In reference to claim 5, Yoshinaga discloses an intensity of light incident on said display element after adjusting the intensity of light and the light control variable by said adjusting unit is smaller than an intensity of light incident on said display element without performing the adjustments (the emission intensity of the light source for emitting light is decrease after the white signal is set according to the detection of the luminance/brightness level of the display data is decrease, i.e. the intensity is smaller than an intensity of light incident on said display element without performing the adjustment; see Fig. 3 shows when the display information is given so that 50% brightness is provided; col. 3, lines 59-67).

In reference to claim 7, Yoshinaga discloses the display element is a liquid crystal display element (see col. 1, lines 7-10).

In reference to claim 10, Yoshinaga discloses the lights of a plurality of colors to be incident on said display element are red light, green light, and blue lights (see Figs. 2-8; col. 7, lines 21-26).

In reference to claim 11, Yoshinaga discloses wherein the lights of a plurality of colors to be incident on said display element are red light, green light, blue light, and white light (Fig. 2-3 and 5-8 show a white light is generated by lighting at the same time the R, G, B light sources).

In reference to claim 12, Yoshinaga discloses display device further comprising a converting unit (14-19) for converting red, green and blue display data into red, green, blue and

white display data (see Fig. 1), wherein said detecting unit (20) detects grayscale levels of display data obtained by said converting unit (14-19).

In reference to claim 14, Yoshinaga discloses a display system for performing a field-sequential type display by synchronizing successive switching of lights of a plurality of colors to be incident on a display element with light control in said display element based on display data of each color corresponding to an image to be displayed, comprising:

detecting a grayscale level of the display data for each color (circuit 14, 15 and 16 detecting luminance/brightness level for each color R, G, B display data); and

adjusting an intensity (by circuits 21,22 and 23) of light incident on said display element and a light control variable in said display element, based on a detection result of the grayscale level ([the detection unit 14, 15 and 16 after detect the luminance/brightness level of the display data R, G and B provide the detection result to the light control unit in light source unit 23 for adjusting an intensity of R,G,B lights incident on the pixel element; see col. 5, lines 6-11 and Figs. 2-8 show the light intensity of the R, G, B light sources are adjusted according to the detected brightness/luminance level display data; furthermore, the result of the luminance/brightness detection result also provide to the display panel 22 to adjust the light control variable in the display element [the variable luminance/brightness of the pixel element of the display] with the R', G', B' and W color signals supplied to the P/S conversion circuit 20 are supplied via the frame memory 21 to the liquid crystal display part 22 to control the light variable (luminance/brightness) of display pixel element the display part 22; see col. 8, lines 57-67)].

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshinaga in view of Sakaguchi et al. (U.S Patent No 6,448,951).

In reference to claim 6, Yoshinaga discloses everything (see rejection as applied to claim 1) except an incident region of light to be incident on the display element is divided, and the detection of grayscale level by the detecting unit and the adjustments of the intensity of light and the light control variable by said adjusting unit are performed for each of the incident regions.

Sakaguchi discloses a liquid crystal display in Fig. 1 in which an incident region of light (3A, 3B and 3C of display 3) and the detection of a grey scale of the level by the detection unit (7) and the adjustments of intensity of light and the light control variable by the adjusting unit (5, 6 and 8) are performed for each of the incident regions (see Fig. 1; col. 5, lines 12-20).

It would have been obvious for one of ordinary skill in the art at the time of the invention to provide the method of dividing the display regions into multiple driving regions in the device of Yashinaga because it would provide a high speed field sequential drive scheme can be employed that uses a currently available low cost of write drive, and low cost of liquid crystal material (col. 1, lines 50-55 of Sakaguchi).

6. Claims 8, 9, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshinaga in view of Sato et al. (U.S Patent No. 7,030,848), hereinafter Sato.

In reference to claim 8, Yoshinaga does not disclose a liquid crystal material used in said liquid crystal display element has spontaneous polarization.

Sato discloses a liquid crystal display using liquid crystal display material used in the liquid crystal display element having spontaneous polarization (col. 42, lines 45-49).

It would have been obvious for one of ordinary skill in the art at the time of the invention use the liquid crystal material display element having spontaneous polarization in the device of Yoshinaga as taught by Sato because it would ensure sufficient light emitting time and achieve more satisfactory display (col. 42, lines 52-55).

In reference to claim 9, Yoshinaga discloses the invention is not limited to liquid crystal element, and may be a light receiving type and projection type display element (col. 7, lines 30-35). Yoshinaga does not disclose the display element is a digital micro mirror device.

Sato discloses liquid crystal display receiving video signal and controlling the intensity of the backlight and a display element based on the receiving display data (see Fig. 4, col. 12, lines 36-54) and the driver circuit can further used for reflective liquid crystal display such as DMD (Digital Mirror Device).

It would have been obvious for one of ordinary skill in the art at the time of the invention to modify the display device having display element is a Digital Mirror Device as taught by Sato as suggested by Yoshinaga (the invention is not limited to liquid crystal element and may be a light receiving type and projection type such as Digital Mirror Device) to provide a reflective

liquid crystal display such as DMD to provide good image brightness and contrast, and therefore produces more reliable grayscale patterns.

In reference to claims 13 and 15, Yoshinaga discloses a display system having detecting unit (14, 15 and 16) for detecting grayscale level of the display data R, G, and B an adjusting unit (21, 22 and 23) and an adjusting unit for adjusting an intensity of light incident on the display element and light control variable in the display element, based on the detection results of the detecting unit (see the rejection of claim 1)

Accordingly, Yoshinaga discloses everything except the display device using a white light source for synchronizing incident of white light on a display element having color and the color filters of a plurality of colors for the system instead of using lights of a plurality of different colors.

Sato discloses an apparatus and driving method for a liquid crystal display using a light sources with different colors, and in an alternative embodiment using light source emitting white light and three color filters of three primary colors are provided instead (col. 42, lines 16-33).

It would have been obvious for one of ordinary skill in the art at the time of the invention to modify the backlight to emit white light and provided color filters of three primary colors in the system of Yoshinaga as taught by Sato because it would provide a display system that performs field sequential color method without dividing sub frame period of respective colors and it is desirable to use LEDs capable of easy control for blinking operation because of the necessity of blinking of the light source (col. 42, lines 35-39).

Response to Arguments

7. Applicant's arguments filed April 23, 2007 have been fully considered but they are not persuasive. Applicant argues that "Yoshinaga does not disclose that the grayscale level of each R, G and B are determined and the intensity of incident light and the light control variable are adjusted for each of R, G and B". However, as discussed above each of the grey scale level of each R, G and B are determined by circuit 14, 15 and 16 (col. 7, lines 40-47) adjust the intensity of each of incident light and the light control variable are adjusted individually for each of R, G and B (see col. 5, lines 39-55 and col. 6, lines 2-13). Therefore, the Rejection is maintained.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DUC Q. DINH whose telephone number is (571) 272-7686. The examiner can normally be reached on Mon-Fri from 8:00.AM-4:00.PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on (571) 272-7691. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/DUC Q DINH
Examiner
Art Unit 2629

DQD
July 6, 2007